

Remarks

The following remarks are submitted in response to the final rejection of February 11, 2005. Claims 1 through 16 were originally presented for examination. Claims 8 through 16 were canceled in response to the Examiner's restriction requirement so only claims 1 through 7 remain for examination in the present application. New claim 17 has been submitted.

Claims 1 and 3-7 have been rejected under Section 103(a) as being unpatentable over Gibson et al. (WO 00/15646). The Examiner states that this reference discloses polymerization of ethylene in a reactor with a cobalt complex catalyst, a liquid phase, and a gas phase which is heat exchanged. The Examiner incorrectly states that the difference between Gibson and the present invention is only in the difference between oligomerization and polymerization. Claim 2 has been rejected as being obvious in view of Gibson in view of Reagan (EP 0608447). Reagan is said to disclose a complex of chromium or titanium used as a catalyst for oligomerizing ethylene. Both of these rejections are respectfully traversed.

The claimed invention is a process for making a linear alpha olefin oligomer in a reactor which must have both a liquid and a gas phase. The process comprises the steps of oligomerizing ethylene in the presence of a catalyst complex, which is selected from the group consisting of nickel, palladium, cobalt, titanium, zirconia, hafnium, vanadium, chromium, molybdenum, and tungsten complexes, to an alpha olefin oligomer in a reaction which involves the release of heat. The heat is removed with a heat exchanger which is not in direct contact with the liquid phase and the heat exchanger uses at least part of the gas phase as a coolant medium.

The remarks in the response of December 9, 2004, are incorporated in this response. On page 2 of the final rejection, the Examiner states that Gibson discloses a process of polymerization of ethylene in a reactor containing a cobalt complex catalyst, a liquid phase, and a gas phase of which is heat exchanged and cites the Abstract, page 9, lines 24-25, page 12, lines 10-25, and page 13, lines 10-25 as basis for this statement. The Abstract contains no reference whatsoever to heat exchange. The reference at page 9 also contains no reference to heat exchange nor does any of the text following that up to page 12. The reference to page 12 does describe cooling the fluidized bed by addition of cool gas (recycled gaseous monomer) at lines 16 and 17 but this is only in connection with a gas phase polymerization process (see line 10 of page 12). The reference to page 13 does discuss heat exchange at lines 22-23 but only in connection with a gas phase fluidized bed process (see line 10 of page 13).

Thus, it is clear that the Examiner's statement at the top of page 3 is incorrect. The text of Gibson starting at line 17 of page 9 up through line 9 of page 12 is a general discussion of the process which is not limited to either liquid phase or gas phase. However, it is clear that all of the

text from line 10 of page 12 on is limited to a discussion of a gas phase polymerization process. (again, see line 10 of page 12 and also line 10 of page 13). It is only in connection with the gas phase process that the heat exchange step is described as being needed. At page 12, lines 18-20, the reference describes the gas phase processes as being free from, or substantially free of liquid.

There is no liquid phase in the gas phase processes described by the reference. The only reference to heat exchange is in connection with the gas phase processes. Therefore, the reference does not describe a process wherein there is a liquid phase and a gas phase in the same reactor wherein at least part of the gas phase is used as a coolant medium for removing heat from the reaction.

Finally, the only method of heat exchange described in Gibson is found on page 13, lines 10-23. The feed fluidizing gas is used to cool the bed and the hot gas from the reactor may be cooled in a heat exchanger which is positioned outside of the reactor. Claim 17 describes a preferred embodiment of the process of the present invention wherein the heat exchanger is positioned within the gas phase within the reactor. Clearly, this claim is independently patentable of the other claims because Gibson does not describe the positioning of the heat exchanger within the gas phase in the reactor.

For these reasons, the Applicants assert that the rejections have been overcome. An early notice of allowance is respectfully requested.

Respectfully submitted,

ARIE VAN ZON, ROBERT MOENE,
PHILLIP E. UNGER, PETER ARNOLDY,
and ERIC J. M. DE BOER

By 

Attorney, Donald F. Haas
Registration No. 26,177
(713) 241-3356

P.O. Box 2463
Houston, Texas 77252-2463